Dental Anesthesia Technique & Review: An Instructional Design Project

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Abstract: At the University of Hawai‘i at Mānoa School of Nursing and Dental Hygiene, Dental Hygiene Program, students are taught every aspect of dental hygiene. One important responsibility of the dental hygienist is successfully and safely administering local anesthesia. The aim of this project is to provide junior and senior dental hygiene students a classroom review prior to clinically administering local anesthesia on live patients. In prior years, students were required to pass three paper quizzes which tested the students’ knowledge of local anesthesia techniques and concepts. Within the last two years, faculty noticed that students were not prepared for this aspect of clinic. Observing the drastic change, this project was developed to bridge the gap by mentally and clinically preparing students to administer local anesthesia. The purpose of this instructional design project was to develop and evaluate the effectiveness of an online module to prepare students with basic intraoral local anesthetic techniques for a clinical setting for junior and senior dental hygiene students at the University of Hawai‘i at Mānoa Dental Hygiene Program. The curated website was created through Wix.com and includes important content and useful pictures as visuals. The project involved 38 students, all were asked to complete a demographic survey, pre-test, embedded test, post-test, and an attitudinal survey. All data collected through Google Forms, were summarized, analyzed and conclusions made. Results reflected positive outcomes, and students found the review beneficial.

Introduction

Students admitted to the University of Hawai‘i at Mānoa School of Nursing and Dental Hygiene, Dental Hygiene Program undergo a very rigorous and demanding curriculum every year. One example is the transition from local anesthesia lectures and bookwork to hands-on, clinical practice administering local anesthesia on patients. Specifically, junior and senior dental hygiene students are not ready for clinical practice when returning to school after fall and summer school breaks. As students return from these breaks, the first few weeks are dedicated to one-on-one clinical administering of infiltration and local block anesthesia on clinical partners, under direct supervision of a dentist. Unfortunately, students often fail to study or review over the breaks, so that the first few weeks of the semester must be used to review and re-teach techniques and concepts taught in previous semesters. The solution to this problem was to create a curated

website that contains online modules, videos, and practice tests. Before being able to administer local anesthesia to live patients, students need to pass the written multiple-choice test questions at 90% or higher. The online modules were needed to help prepare students with basic intraoral local anesthetic knowledge and techniques when in a clinical setting.

The online module included four topics: Armamentarium, Landmarks, Maxillary Injections, and Mandibular Injections. With each topic, adequate information was provided along with pictures. Resources used for the content ranged from textbooks to first-hand experiences. Pictures included were taken of students and patients of the University of Hawai'i at Mānoa Dental Hygiene Clinic. A signed consent form was included in each person's chart on file to allow permission for pictures. Lastly, tests were provided after each section and a cumulative post-test at the end of the online module.

The purpose of the instructional design project was to develop and evaluate the effectiveness of an online module for preparing students with basic intraoral local anesthetic techniques for a clinical setting. The target population includes all future dental hygiene students at this point in the program, as they learn the didactic portion of local anesthesia in the Spring semester before summer break. The online module allowed the students to review content and techniques during the first few weeks of the new semester after returning from school breaks. Senior dental hygiene students were also included in the project to test their knowledge compared to the junior class and to provide review for clinical practices and the National Dental Hygiene Board Examination.

Literature Review

Dental local anesthesia has been around for years to provide patient comfort and painless treatment. The administration of local anesthesia by dental hygienists has been studied and reported in literature for over 30 years (Boynes, Zovko, Bastin, Crillo, Shingledecker). During the research process, the common theme in content related resources was the idea of the importance of having proper education and training in the administration of dental local anesthetic (Brand, Baart, Maas, Bachet). Gaining an understanding of the background of anesthetics and the ability to deliver anesthetic injection techniques correctly is an important aspect of the dental curriculum (Brand, Baart, Maas, Bachet). The module was created for this specific topic and provided students with the necessary background knowledge was applied as local anesthetic was administered on live patients.

Local anesthesia education is one of the fundamental components of the dental and dental hygiene curriculum. Many students feel uncomfortable and insufficiently prepared for their first injection in a clinical setting (Lee, Graham, Bassiur, Lichtenthal). At the University of Hawai'i at Mānoa Dental Hygiene Program, a student's first injection in the clinical setting is administered to a fellow student, similar to other dental or dental hygiene schools. By

reinforcing this type of training, students learn to be comfortable, prepared, and confident in administering local anesthesia in the clinical setting.

Another motivation for this project involved electronic training modules. Training models such as these, that indicate the accurate site of injection have been available for at least three decades. Currently, only a minority of dental schools use these models before students' initial injections on humans, but several additional schools have reported plans to introduce them into their curricula (Brand, Baart, Maas, Bachet). Having resources such as this will hopefully create a positive impact on students' anxiety. Current educational approaches within higher education utilize blended learning, a combination of traditional face to face (F2F) instruction in class and are also required to complete activities outside of the class, facilitated through a range of technological resources. Blended learning has become increasingly popular in higher education globally, forming the cornerstone of curriculum design and providing opportunity for learning not previously possible or available to students (O'Flaherty, J., Phillips, C.).

Project Design

The idea of visual context strongly supports the foundation of the website design. Visual context refers to the presentation of content that improves the delivery of a website's message (Khalid, 2017). With the perspective of the target audience in mind, details such as color schemes and image types will help to provide a better understanding of the displayed content.

According to present-day color theories, everyday colors have a significant impact on human behavior. Colors can also influence our decision-making and perceptions of a person, brand, or establishment in a matter of seconds (Selecting Colors For Your Medical or Dental Website, 2018). Various shades of blues are very common among dental websites as blue is the color of trust and intelligence. Displaying comfort and assuring patients that they are "in good hands" are a few reasons why the color blue is very appealing (Figure 1). Although this website was intended for dental hygiene school students, when choosing a color palette, blue was selected as there is a possible relationship between the color and field of dentistry.

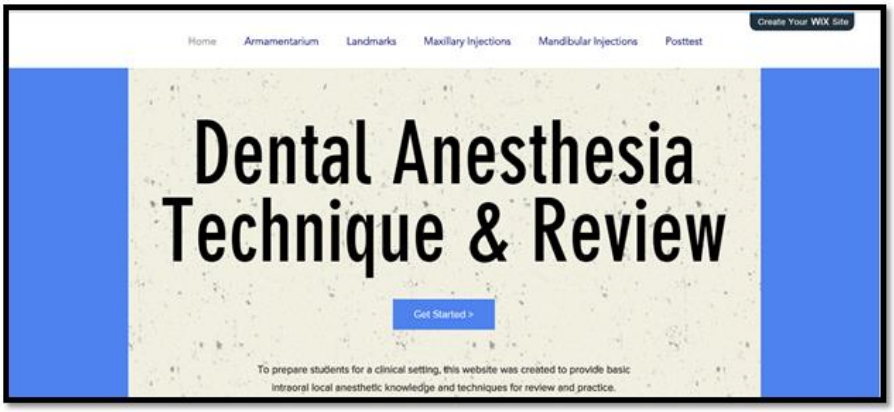

Figure 1. Blue color scheme displayed on landing page.

Another key feature for creating visual context is the use of arrows to show direction and encourage "flow" throughout the website. The arrows traditionally point in the direction to the right as English is read from a left to right direction. Arrows also prompt that there is further information that needs to be reviewed, thus providing direction for the user (Khalid, 2017). In regards to the "flow" throughout the website, users are not idle or unsure where to go next (Figure 2, Appendix A).

Figure 2. Landing page containing arrows showing direction to further pages.

To enrich visual context, certain words or phrases are formatted to express their importance. Titles were formatted in San Serif capital letters, larger font size, bold, and spaces between each letter. This allowed for ease of reading and emphasis of the word or phrase. Subtitles slightly differed as they were not all capital letters, not bold, and were smaller in font size, but bigger than the rest of the text. Figure 3 provides examples of the title and subtitle in one section of the website.

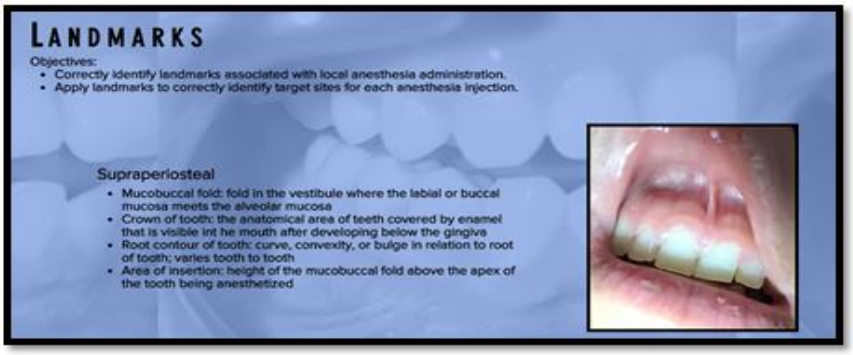

Figure 3. Selected words are bigger and bold to enrich visual context at the top of the page on a specific module.

Khalid (2017) explains that visuals included in a website have a "sensual" appeal compared to a textual context. Users will likely notice the images that are complementing the overall context, rather than phrases and paragraphs. Although content heavy, all aspects of each step-by-step process was necessary for technique purposes. Figure 4 shows that line length is important because long lines of text are intimidating to read online. Putnam (2014) explains that if the line length is too long, people will not begin reading because it doesn't look like it will be a very good reading experience. Formatting the text and image using the ⅓ rule helps readers to easily glide across the page and doesn't overwhelm them.

Figure 4. Image complementing the heavy textual context in one section of the website.

Methods

The sample population included junior and senior dental hygiene students at the University of Hawai'i at Mānoa School of Nursing and Dental Hygiene Program with a population size of 38 students. Table 1 shows that female students comprise of 94.7% of the population. About half

of the students (52.6%) belong to the post-millennial demographic (Steinmetz, 2017), also known as Generation Z (Ages 17-24). With this statistic in mind, 94.7% are currently single, or have never married. Of the total population size, only 10% belong to more than one ethnicity. With majority of the students earning their first degree through this program, 13.1% have already earned an advanced degree. Because there were broad spectrums of interest and motivation levels, students completed the online modules and tests to allow for uniformity.

Table 1. *Gender, Age, Ethnicities, Marital Status, Highest Achieved Education*

Characteristic	Number	Percentage
Gender		
Female	**36**	**94.7%**
Male	1	2.6%
Prefer not to say	1	2.6%
Age		
17-24	**20**	**52.6%**
25-34	16	42.1%
35-44	1	2.6%
45+	1	2.6%
Ethnicities		
One ethnicity	**34**	**89.4%**
More than one ethnicity	4	10.5%
Marital Status		
Single, never married	**36**	**94.7%**
Married/domestic partnership	1	2.6%
Separated	1	2.6%
Highest Achieved Education		
High School Diploma	**15**	**39.4%**
Associate's Degree	**18**	**47.3%**
Bachelor's Degree	4	10.5%
Master's Degree	1	2.6%

The milestones in LTEC 687 provided the foundation for the implementation in LTEC 690. LTEC 687 milestones included: developing a strong problem and purpose statement, proposing a project idea and plan, creating modules and prototype website, and finalizing the project plan. LTEC 690 milestones included implementation of the project, collecting and analyzing data, and sharing the results.

Prior to the implementation of the project, students were emailed a recruitment letter (Appendix B) and a consent form (Appendix C). The recruitment letter explained about the project, its purpose, what is asked of the students, and how it will benefit them. The consent form included an explanation of the proposed activities with a corresponding timeline, benefits and risks, privacy and confidentiality, voluntary participation policy, contact information, and a link to the demographic survey if they agree to participate in the project.

Within the first week of returning to school for the Spring 2018 semester, students were asked to use their own mobile devices (desktop, laptop, tablet, or phone) to complete the online module and tests on a pre-assigned day in which the project was conducted. An attitudinal survey was the last task, so that students could provide feedback on their opinions and view of the online modules and tests.

The curated website was produced through Wix.com. Prior to completing the online modules, students were asked to complete a demographic survey (Appendix D) along with a pretest (Appendix E). Once these tasks were done, students were able to start the online modules along with embedded tests questions. When all modules and embedded tests were complete, students were asked to complete the post-test (Appendix F) and exit attitudinal survey (Appendix G). Google Forms were used to track all the results of completed pre, embedded, and posttests, along with the completion attitudinal surveys.

The collected data was then organized in Google Sheets. Percentages were calculated for each question asked in the pre, embedded, and posttests. Comparisons were developed to determine if students have learned the content. The attitudinal survey provided insight of the students' perspective and opinion of the overall website and content involved.

Results

The purpose of the instructional design project was to develop and evaluate the effectiveness of an online module for preparing students with basic intraoral local anesthetic techniques for a clinical setting. Comparing test results provided a concrete representation of the effectiveness of the website online module. This section will provide results, insight, and comparisons from all tests completed by each student in their respective classes.

Pre-Test, Embedded Tests, Post-Test. Prior to completing the module, all students have successfully completed the local anesthesia pre-requisite course during their first year in the dental hygiene program. It is their own responsibility to study and review anesthesia techniques occasionally to ensure successful clinical habits. The pre-test showed the level of knowledge of each student within their respective class.

The embedded tests were divided into four different sections: Armamentarium, Landmarks, Maxillary Injections, and Mandibular Injections while using the same questions from the pre-test as practice. The Armamentarium section asked students to correctly identify different apparatus and equipment needed when administering local anesthesia. Students were provided a picture and vocabulary words to use for identification. In the Landmarks section, students were asked to correctly identify the different landmarks that are necessary to successfully administer local anesthesia. Pictures were provided with letters that labeled different landmarks within the area of interest. Students were asked to select the correct answer for the corresponding landmark. In the Maxillary and Mandibular Injections sections, students were asked to correctly identify the injection sites for the anesthetic injections on the corresponding arch. Pictures were provided with labeled letters as students were asked to select the best answer for the corresponding injection.

Important Findings. The pre-test results displayed baseline knowledge students possess prior to completing the modules. Figure 5 shows the pre-test results reflecting higher scores for senior students (86.3) when compared with junior student scores (80.9). This conclusion presumed as senior students have one more year of clinical experience and practice.

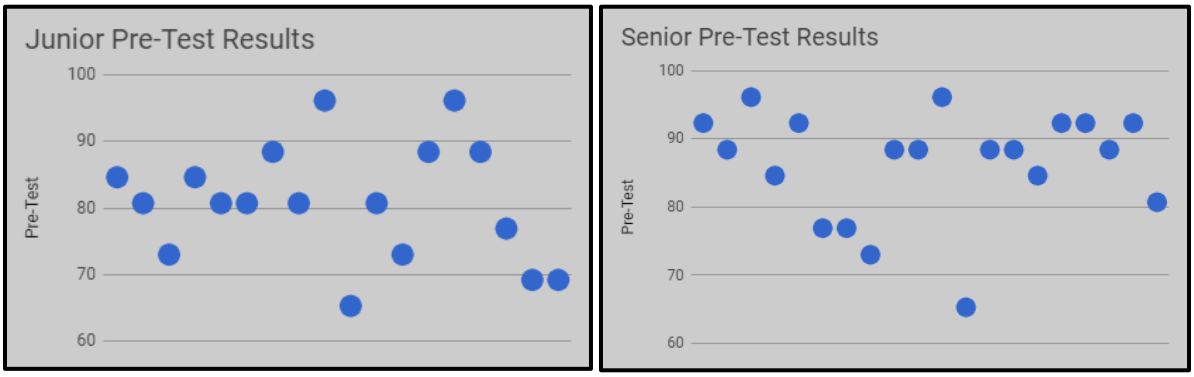

Figure 5. Scatterplot of Pre-Test scores for junior and senior students.

The post-test results show increased (or decreased) knowledge students have acquired after completing the modules. Although the results do not reflect 100% of knowledge obtained, it is still the students' responsibility to study and review anesthesia techniques to ensure successful clinical habits. For the most part, the post-test results reflected higher scores in both junior and senior classes, thus concluding that the module was quite successful and engaging for the students (Figure 6).

Figure 6. Pre- and post-test results between the junior and senior classes.

The embedded test results were intended to show increased knowledge of the content material in each section relative to the assigned pre-test. The embedded tests also prepare students for the post-test at the end of the module. When comparing the results from the pre-test and embedded tests, there was a definite increase in higher scores for both classes. In the Armamentarium section, Learning Objective 1 included five parts. The most important result of this Learning Objective was the students' knowledge differentiating between the two anesthetic syringes that are used in clinic. Learning Objective 2 asked students to identify the part of the syringe that differentiates between an aspirating and self-aspirating syringe. A handful of students, from the junior and senior class, learned these concepts through the modules. With an increase of test scores from the pre-test to the embedded test, Figure 7 results display that students have acquired this knowledge.

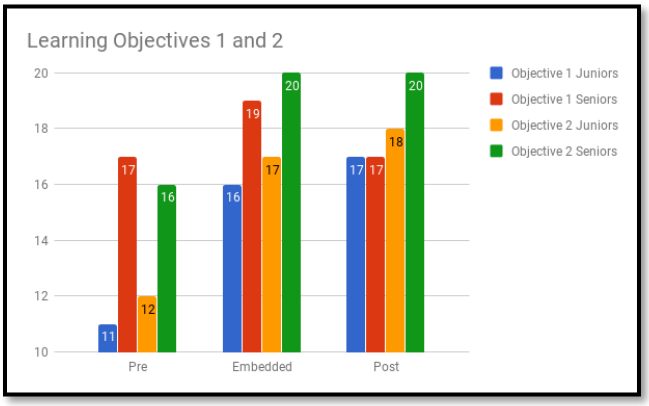

Figure 7. Pre, embedded and post-test results by class.

In the Landmarks section, the most important result was the students' knowledge of identifying the mucobuccal fold (Learning Objective 3) and the base of the papilla (Learning Objective 8). From the pre-test to the embedded test, students had a better understanding of where the mucobuccal fold would be located. When transferring the concept to the post-test, it seems like there was a disconnect (Figure 8). This may have happened because sometimes students need

more practice to fully understand a concept or they may have forgot it by the time they completed the post-test. Changes were also made to the post-test pictures and labels to resolve the confusion students may experience. On the other hand, the concept of identifying the base of the papilla showed an increase in test scores in both classes (Figure 9). At the time of the pre-test not all students understood this concept. When reviewed in the module and practice test, almost all the students answered correctly. By the time all the students took the post-test, the results reflected that they understood this concept with 100% of students answering correctly.

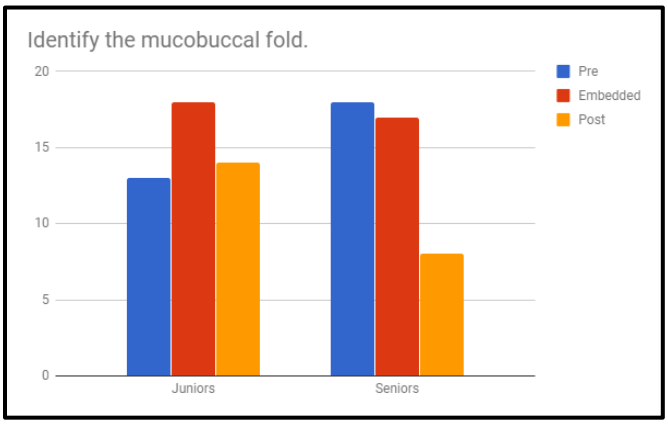

Figure 8. Pre, embedded, and post-test results showing a surprising score decrease in Learning Objective 3 by class.

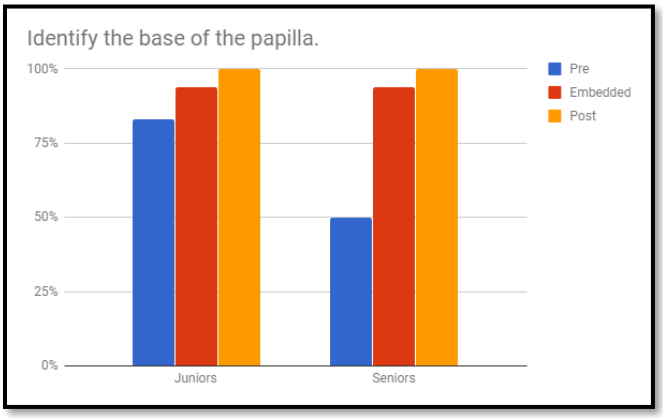

Figure 9. Pre, embedded, and post-test results showing an overall score increase in Learning Objective 8 by class.

The most important result in the Maxillary Injections section reflected the importance of providing clear pictures and understandable labels. Figure 10 displays two specific questions within this section that reflected this shortcoming. The pre-test and embedded test scores were unfortunately lower than the post-test scores. One of the reasons why this happened was because the pictures with labels were not clearly defined. Fortunately, the post-test provided a picture with clearer labels in which students were able to successfully identify the correct injection.

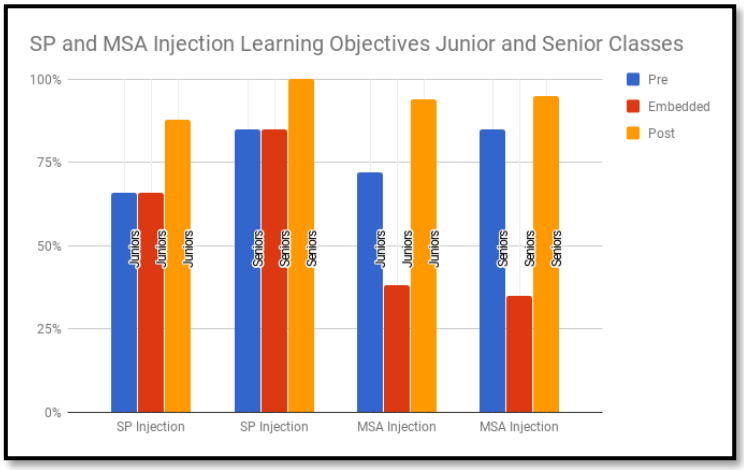

Figure 10. Test score discrepancies between Learning Objectives 14 and 16 by class.

For the Mandibular Injections section, the most important result was the test scores between both classes. The questions selected for the analysis required students to critically think in steps. It was quite interesting to see the junior class obtain higher test scores when compared to the senior class test scores on this objective (Figure 11). The logical explanation for this could possibly be when each class completed the required lecture anesthesia course. It's been a year since the junior class has completed this course, while for the senior class, it's been about two years. Figure 10 also shows a big drop in the post-test scores for both classes. Just like in the Maxillary Injections section, one of the reasons why this happened was because the pictures with labels were not clearly defined and may have caused confusion for the students. With a random set of test results for each class, this specific section may need to be reviewed again. One revision would be to use a clear and understandable picture with labels that specifically point to specific target areas or landmarks. Another revision that can be implemented is to provide more visuals for students to view. This will allow the students to clearly identify the correct target area or landmark with no confusion.

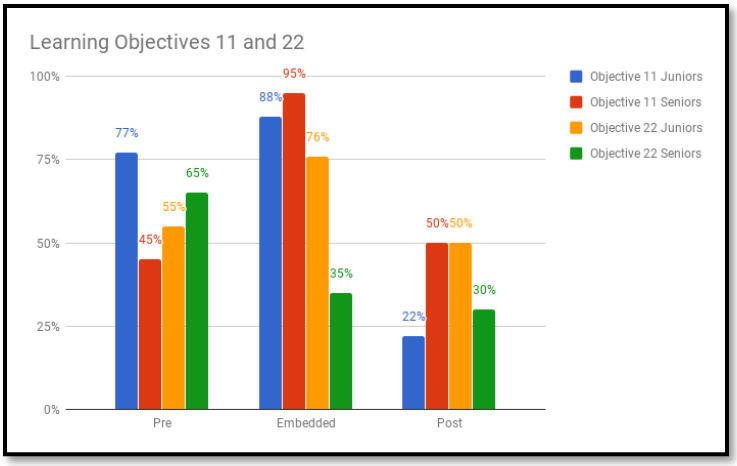

Figure 11. Test score discrepancies by between Learning Objectives 11 and 22.

Discussion and Conclusions

From the beginning stages of this project, there were good intentions and great ambitions. By creating a main goal, it helped to narrow and shape the module that I planned to create. With the help of a thorough needs assessment, all necessary topics were included for the success of the module. The website module was easily accessible and user friendly. It required many revisions from misspellings to page format. In the exit attitudinal survey, students expressed that the module was very informative and easy to use. Other suggestions included adding clearer pictures, adding short videos, and labeling pictures with arrows. With the comments and suggestions, I plan to revise the module further and incorporate it within the anesthesia curriculum within the Dental Hygiene School.

For this project, the target population was specifically for junior and senior dental hygiene students at the University of Hawai'i at Mānoa School of Nursing and Dental Hygiene. If this project were to be further developed, reaching other learning institutions would be an overall goal. This may include national and international dental hygiene and dental learning institutions that have local anesthesia administration included in their curriculum. This project directly relates to what I currently do at the University of Hawai'i at Mānoa Dental Hygiene School. In the future, I hope to co-teach this course, then eventually be the lead instructor. Throughout the semester, students are observed on a one-to-one basis by a dental faculty who assess the student's clinical skills and knowledge of administering infiltration and local block anesthesia. Observing unprepared students in clinical practice was the greatest motivation for the development online modules and graded tests. In the long run, as students are better prepared for clinical practice, patients experience high, quality dental treatment. Lastly, the implementation and evaluation processes are directly related to the field of learning design and technology.

These concepts utilize technology to advance timelines within a project, which will allow for more effective learning environments for intended target populations.

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APPENDIX A

Arrow showing direction to the intended next section after the completion of a module.

APPENDIX B
Recruitment Letter

Recruitment Letter

Junior and Senior Dental Hygiene Students,

My name is Natasha Fong, and I am doing a research project as part of the requirement for earning my Master's Degree. The purpose of the project is to better prepare junior and senior dental hygiene students with basic intraoral local anesthetic techniques for a clinical setting using an online module. I would like to invite you to participate because you are a junior or senior student in the Dental Hygiene Program here at the University of Hawai'i at Manoa.

What will you have to do?
Your participation will involve you working through an online learning module on a website I created. I will schedule a 90-120 minute long session for you along with your classmates to fill out questionnaires and work though the site. There may be a chance in which you're selected to conduct a 1:1 session instead. I will be present at the session to answer any questions or help if there are any problems. Please bring your own laptop to the session that day to access the online module.

What will the online learning module be about?
The module is designed to review the proper basic intraoral local anesthetic techniques required for clinical practice. You will review needle sizes, needle insertion depth, sites of injection, and important landmarks. You will then be presented with scenarios and case studies which you will evaluate to determine the proper technique that should be used.

How will the learning module help you?
There will be no implications on your current school work. The learning module will be a refresher and provide you with proper basic intraoral local anesthetic techniques taught in your previous anesthesia class. Completion of this the module will provide verification that you have demonstrated competency prior to administering on live patients in clinic. You will not be at any risk when you participate in this project.

Other considerations:
Participation in this project is completely voluntary. Any personal information collected during this project will be kept confidential. Any data collected will not be reported with your name or other personal identifiers.

Your participation in this research project would be greatly appreciated. Your feedback will be used to improve the online learning module for future Dental Hygiene Students at the University of Hawai'i at Manoa. If you have any further questions regarding this project, please feel free to contact me.

If you agree to participate in this project, please sign and date the attached consent form. You can submit the form via email at fongn@hawaii.edu, or drop it off at my office in Hemenway Hall 232.

Thank you,

Natasha Fong
Email: fongn@hawaii.edu

APPENDIX C
Consent Form

Consent Form

University of Hawai'i at Manoa

Consent to Participate in Research Project:

Dental Anesthesia Technique & Review: An Instructional Design Project

My name is Natasha Fong, and I am a graduate student at the University of Hawai'i at Manoa, College of Education, Department of Learning Design and Technology. I am doing a research project as part of the requirement for earning my Master's Degree. The purpose of my project is to improve and evaluate an online module to better prepare junior and senior dental hygiene students with basic intraoral local anesthetic techniques for a clinical setting. I am asking you to participate because you are a junior or senior student in the School of Dental Hygiene Program here at the University of Hawai'i at Manoa.

Activities and Time Commitment: If you choose to participate in this project, I will schedule a 90-120 minute long session for you along with your classmates to work through surveys, test items, and the site including the modules. There may be a chance in which you're selected to conduct a 1:1 session instead. I will be present at the session to answer any questions or help if there are any problems. During the activity, you will first review the proper basic intraoral local anesthetic techniques required for clinical practice. Next, scenarios and case studies will be presented in which you will evaluate to determine the proper technique that should be used.

Benefits and Risks: Certification in the administration of intraoral infiltration and block local anesthesia is a prerequisite to applying for Hawaii dental hygiene licensure. Completion of this module will provide verification that you have demonstrated competency prior to administering on live patients in clinic. The learning module will be a refresher and provide you with proper basic intraoral local anesthetic techniques taught in your previous anesthesia class. Completion of this the module will provide verification that you have demonstrated competency prior to administering on live patients in clinic. You are required to complete the modules and test question items, but there will be no implications on your current school work. The data of consented volunteers will be collected and used for research. You will not be at any risk when you participate in this project.

Privacy and Confidentiality: The electronic data collected will be encrypted and stored in a password protected computer, and hard copy data will be locked in a file in a locked office. Myself, Dental Hygiene School faculty, and my University of Hawai'i faculty advisor, Dr. Catherine Fulford will have access to the information. Other agencies that have legal permission to access the information, such as the University of Hawai'i Human Studies Program, have the right to review research records for this study. When results of the project are reported, names will not be used. Personal identification information will not be used to protect your privacy and confidentiality to the extent allowed by law.

Voluntary Participation: Your participation in this project is completely voluntary. You may stop participating at any time. Additionally, if you don't complete the study for any reason, there will be no penalty or loss to you.

Contact information: For any questions regarding the project, please feel free to contact me, at fongn@hawaii.edu or my University of Hawai'i faculty advisor, Dr. Catherine Fulford at (808) 956-3906. You may contact the UH Human Studies Program at (808) 956-5007 or by e-mail at uhirb@hawaii.edu to discuss problems, concerns, and questions; obtain information; or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit https://www.hawaii.edu/researchcompliance/information-research-participants for more information on your rights as a research participant.

If you agree to participate in this project, please click the link below and proceed to fill out the demographic survey through Google Forms.

https://docs.google.com/forms/d/e/1FAIpQLSfAD6kDFb6A0NL2i3E1gXPDc2e_2McYlSQ1S_qf5omzKznIEw/viewform?usp=sf_link

APPENDIX D
Demographic Survey

Demographic Survey

Please fill out the survey below. General demographic information will be collected for improving the instructional module. All information will be kept confidential and will not be shared with outside parties.

* Required

1. **Enter ID** *

_____

2. **What is your age?** *
Mark only one oval.

- ◯ 17-24
- ◯ 25-34
- ◯ 35-44
- ◯ 45+

3. **What is your gender?** *
Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ Prefer not to say

4. **What ethnicity do you identify with? (Select all that apply.)** *
Check all that apply.

- ☐ African-American
- ☐ American Indian/Native American
- ☐ Asian/Pacific Islander
- ☐ Caucasian
- ☐ Latino/Hispanic
- ☐ Other

5. **What is your marital status?** *
Mark only one oval.

- ◯ Single, never married
- ◯ Married or domestic partnership
- ◯ Widowed
- ◯ Divorced
- ◯ Separated

6. **What is your highest achieved education?** *
Mark only one oval.

- ◯ High School Diploma
- ◯ Trade/Technical/Vocational Training
- ◯ Associate's Degree
- ◯ Bachelor's Degree
- ◯ Master's Degree

7. **Have you taken an online course before?** *
Mark only one oval.

- ◯ Yes
- ◯ No

8. **How comfortable are you with using a laptop computer?** *
Mark only one oval.

	1	2	3	4	5	
Not comfortable	◯	◯	◯	◯	◯	Very comfortable

9. **What is your current level in the Dental Hygiene Program at the University of Hawai'i at Manoa?** *
Mark only one oval.

- ◯ Junior
- ◯ Senior

Juniors: SUBMIT survey at the bottom of the page. Seniors: Answer the following questions before submitting survey.

10. **Are current anesthesia pre-clinical activities (administering local anesthesia on student partners) engaging and challenging?**
Mark only one oval.

	1	2	3	4	5	
Disagree	◯	◯	◯	◯	◯	Agree

11. **Does the information presented in DH 369 lecture provide you with the necessary knowledge to complete your pre-clinical activities?**
Mark only one oval.

	1	2	3	4	5	
Disagree	◯	◯	◯	◯	◯	Agree

12. **During your pre-clinical activities, do faculty provide guidance and feedback on your performance?**
Mark only one oval.

	1	2	3	4	5	
Disagree	◯	◯	◯	◯	◯	Agree

13. **How confident are you about administering local anesthesia on live patients?**
Mark only one oval.

	1	2	3	4	5	
Not comfortable	◯	◯	◯	◯	◯	Very Comfortable

APPENDIX E
Pre-Test and Embedded Test Questions

Pretest

* Required

1. **Enter ID** *

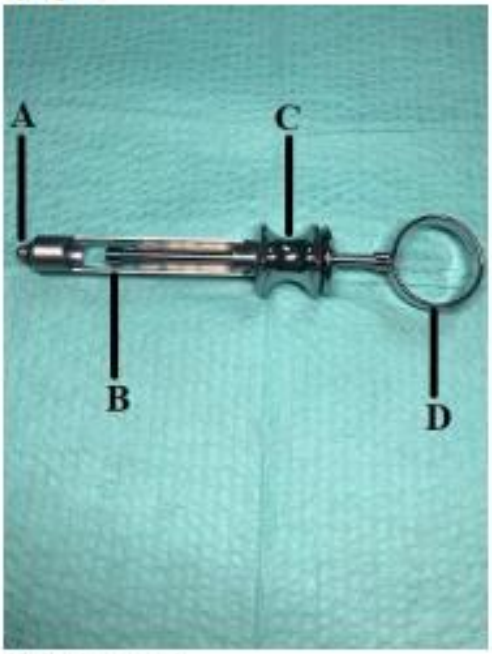
Armamentarium

2. **Identify and label each armamentarium in the picture below.** *

Mark only one oval per row.

	Aspirating syringe	Cartridge	Hemostat	Long needle	Needle capper	Self-aspirating syringe	Short needle	Topical anesthetic
A								
B								
C								
D								
E								

3. **Identify the part of the syringe that differentiates between aspirating and self-aspirating syringes.** *



Mark only one oval.

- A
- B
- C
- D

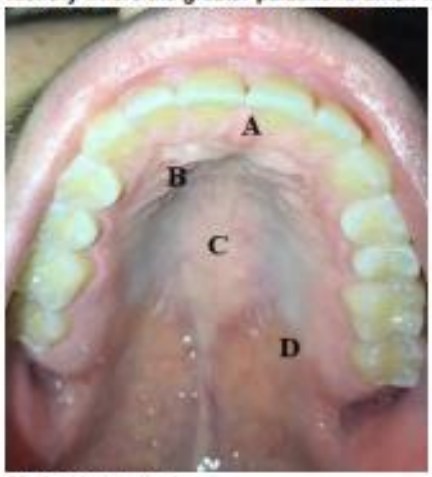
Landmarks

4. **Identify the mucobuccal fold.** *

Mark only one oval.

- A
- B
- C
- D

5. **Identify where the greater palatine foramen will be located.** *



Mark only one oval.

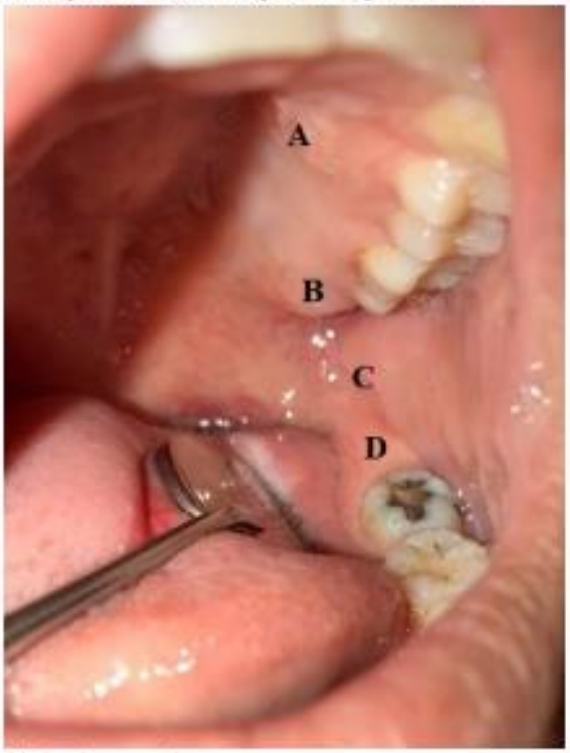
- A
- B
- C
- D

8. **What landmark is the arrow point to?** *

Mark only one oval.

- ◯ Incisive papilla
- ◯ Inderdental papilla
- ◯ Lingual frenum
- ◯ Palatine rugae

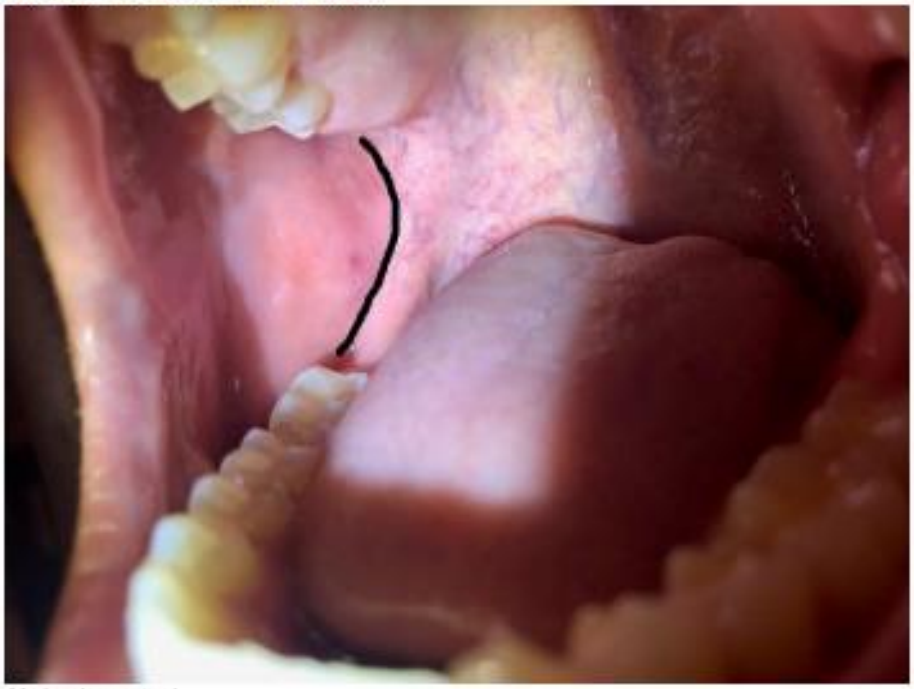
7. **Identify where the maxillary tuberosity is located.** *



Mark only one oval.

- A
- B
- C
- D

8. **The black line indicates what landmark?** *



Mark only one oval.

- ◯ Coronoid notch
- ◯ Pterygoid muscle
- ◯ Pterygomandibular raphe
- ◯ Sublingual fold

9. **Identify the base of the papilla.** *

Mark only one oval.

- ◯ A
- ◯ B
- ◯ C
- ◯ D

Anesthesia Innervation

10. **For your patient today, Dr. Fong will be doing flap surgery in QII. What blocks will you administer?** *

Mark only one oval.

- ◯ Bilateral PSA, Bilateral MSA, Bilateral ASA, Bilateral GP, NP
- ◯ Left PSA, Left MSA, Left ASA, Left GP, NP
- ◯ Left PSA, Left MSA, Right ASA, Left GP, NP
- ◯ Right PSA, Right MSA, Right ASA, Right GP, NP

11. **Dr. Arucan recommends soft tissue curettage in QIV for the patient seated in your chair. She will observe you administering local anesthesia prior to the curettage. What blocks will you give?** *

Mark only one oval.

- ◯ Bilateral IA/Li, Bilateral LB
- ◯ Bilateral Mental & Incisive
- ◯ Left IA/Li, Left LB
- ◯ Right IA/Li, Right LB

12. **For your surgery patient today, Dr. Yamada will be doing a gingivectomy. He asks you to anesthetize all teeth, soft tissue, and bone in sextant 5. Bilateral IA/Li blocks are not an option. What injections do you administer?** *

Mark only one oval.

- ◯ Bilateral Mental/Incisive
- ◯ Left IA/Li, Left LB
- ◯ Right IA/Li, Right LB
- ◯ SP to teeth #22-27

13. **In the picture below, what block is being administered?** *

Mark only one oval.

- ◯ ASA
- ◯ ID
- ◯ GP
- ◯ NP

14. **The facial of the upper right canine presents with a 5mm pocket reading with detectable heavy subgingival calculus. The tissue is edematous with heavy BOP. Dr. Oishi recommends scaling and root planing along with soft tissue curettage. There are no other areas of the mouth that needs this treatment. How will you anesthetize the localized area?** *

Mark only one oval.

- ◯ Left ASA, NP
- ◯ Right ASA, NP
- ◯ SP #6, ID #5/6, ID #6/7
- ◯ SP #11, ID #10/11, ID #11/12

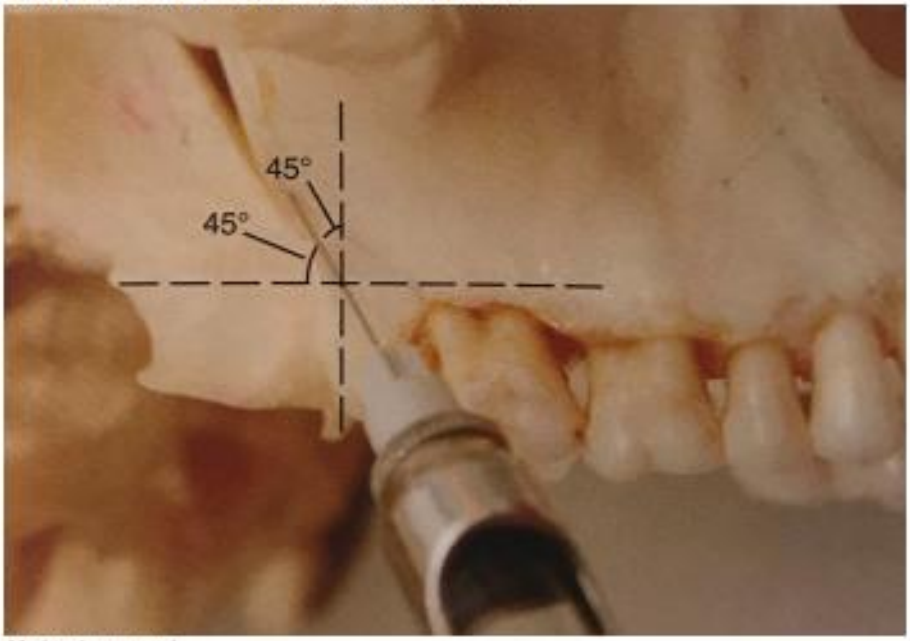
Anesthesia Injection Technique

15. **Where is the correct injection site for Supraperiosteal #8?** *

Mark only one oval.

- A
- B
- C
- D

16. **What block is being displayed in the following picture?** *



Mark only one oval.

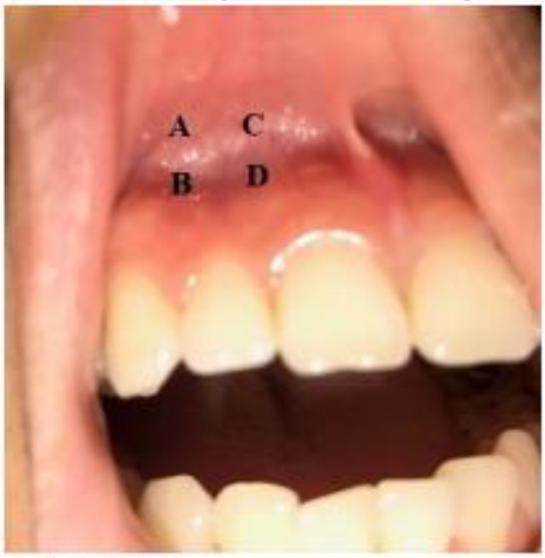
- GP
- MSA
- PSA
- SP

17. **Where is the correct injection site for the MSA injection?** *

Mark only one oval.

- A
- B
- C
- D

18. **Where is the correct injection site for the ASA injection?** *



Mark only one oval.

- A
- B
- C
- D

19. **Letter D is the injection site for which block?** *

Mark only one oval.

- ID
- GP
- NP
- SP

20. **The arrow is pointing to the injection site of which block?** *

Mark only one oval.

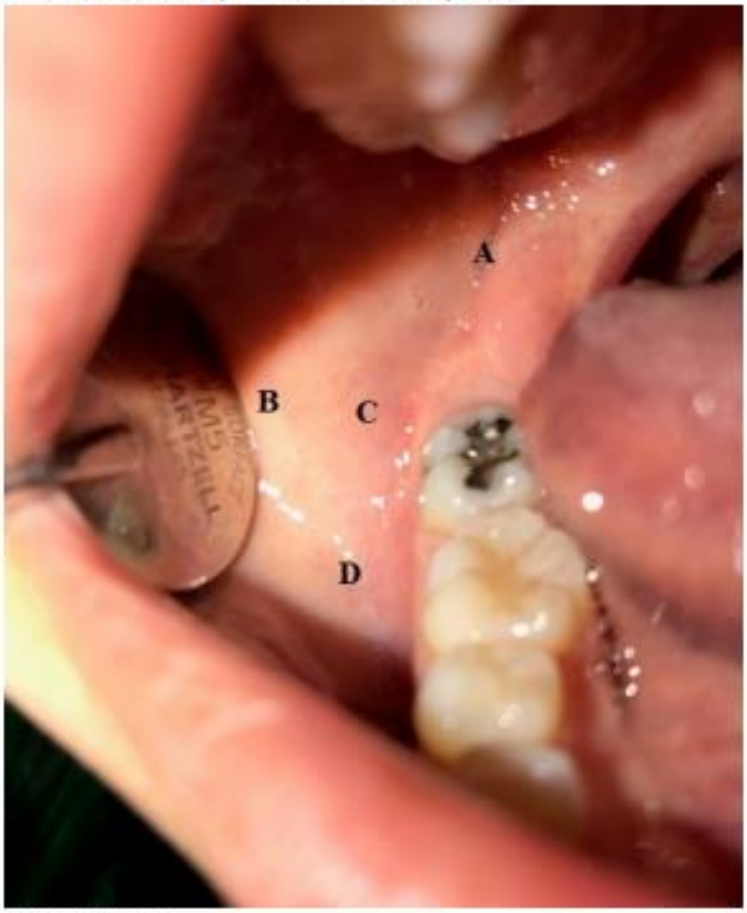
- ID
- GP
- NP
- SP

21. **Where is the correct injection site for the IA/LI injection?** *

Mark only one oval.

- A
- B
- C
- D

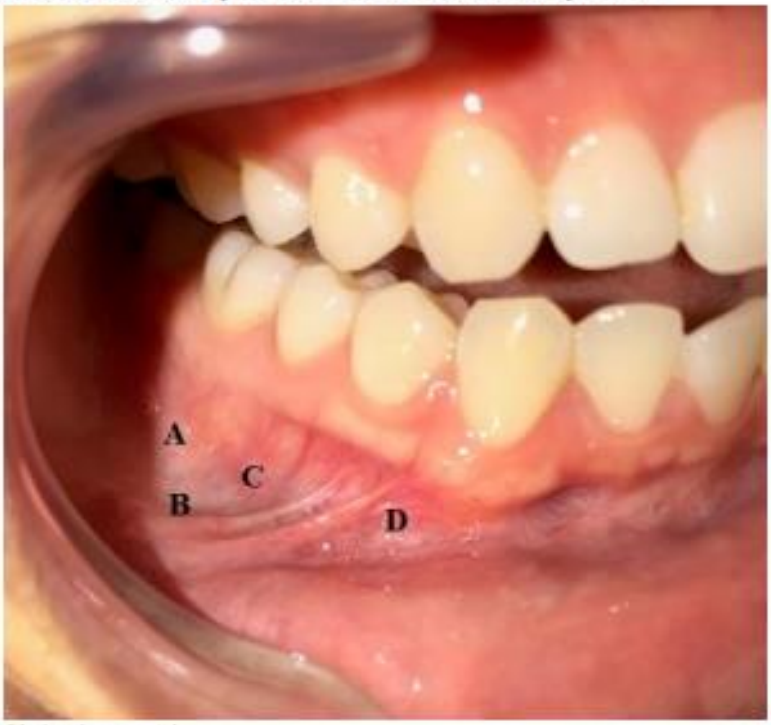
22. **Where is the correct injection site for the LB injection?** *



Mark only one oval.

- A
- B
- C
- D

23. **Where is the correct injection site for the mental/incisive injection?** *



Mark only one oval.

- A
- B
- C
- D

24. **Where is the correct injection site for an interdental injection?** *

Mark only one oval.

- A
- B
- C
- D

APPENDIX F
Post-Test Questions

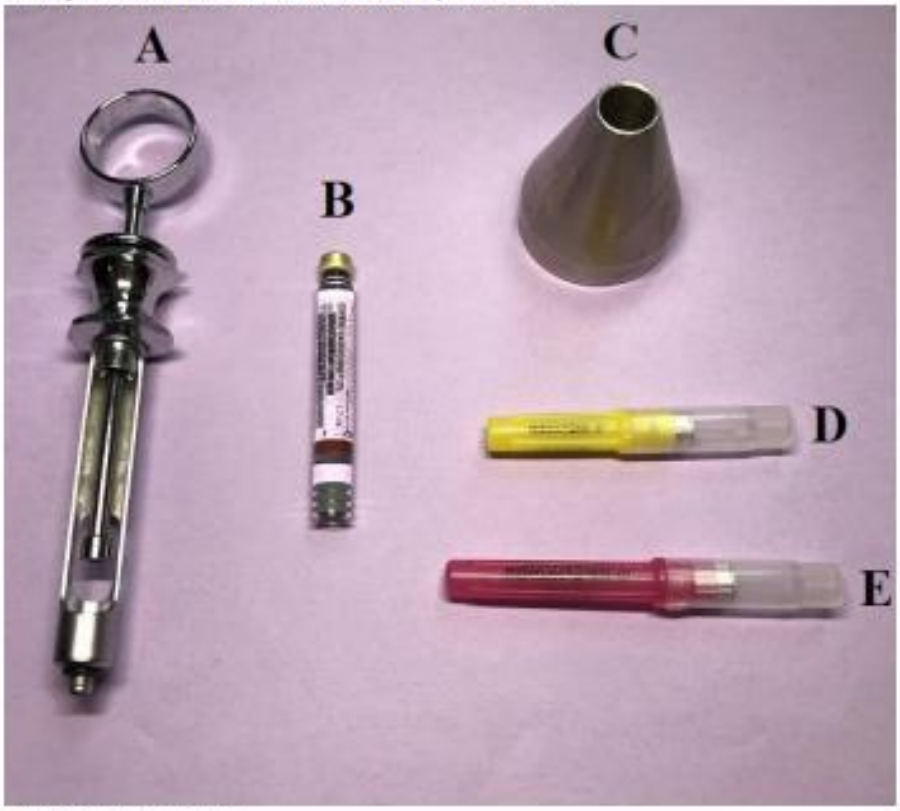
Posttest

* Required

1. Enter ID *

Armamentarium

2. **Identify and label each armamentarium in the picture below.** *



Mark only one oval per row.

	Aspirating syringe	Cartridge	Hemostat	Long needle	Needle capper	Self-aspirating syringe	Short needle	Topical anesthetic
A	◯	◯	◯	◯	◯	◯	◯	◯
B	◯	◯	◯	◯	◯	◯	◯	◯
C	◯	◯	◯	◯	◯	◯	◯	◯
D	◯	◯	◯	◯	◯	◯	◯	◯
E	◯	◯	◯	◯	◯	◯	◯	◯

3. **Identify the part of the syringe that differentiates between aspirating and self-aspirating syringes.** *

Mark only one oval.

- A
- B
- C
- D

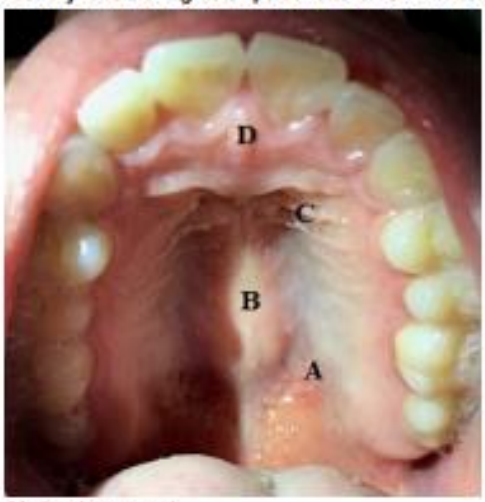
Landmarks

4. **Identify the mucobuccal fold.** *

Mark only one oval.

- A
- B
- C
- D

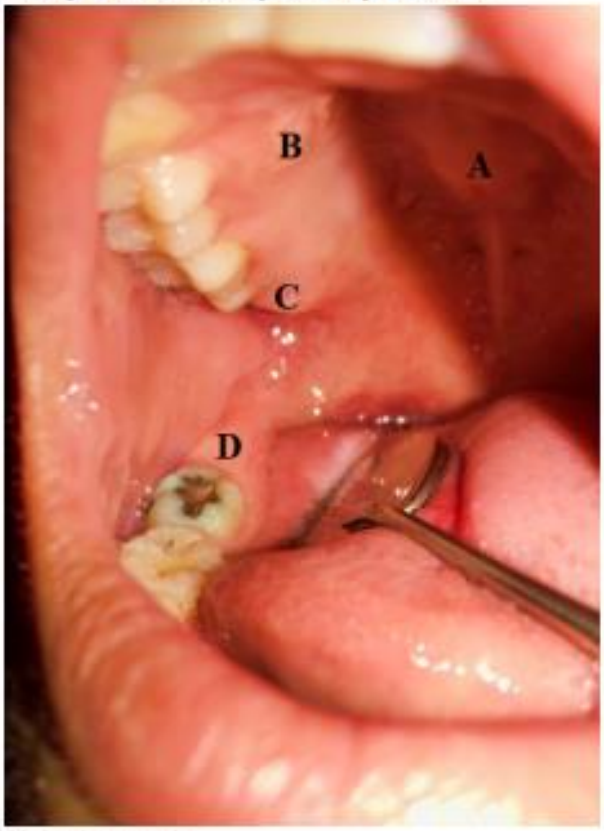
5. **Identify where the greater palatine foramen will be located.** *



Mark only one oval.

- A
- B
- C
- D

6. **Identify where the maxillary tuberosity is located.** *



Mark only one oval.

- A
- B
- C
- D

7. **The red line indicates what landmark?** *

Mark only one oval.

- ◯ Coronoid notch
- ◯ Pterygoid muscle
- ◯ Pterygomandibular raphe
- ◯ Sublingual fold

8. **Identify the base of the papilla.** *

Mark only one oval.

- ◯ A
- ◯ B
- ◯ C
- ◯ D

Anesthesia Innervation

9. **The facial of the maxillary left first premolar presents with 5-6mm pocket readings with detectable heavy subgingival calculus. The tissue is edematous with moderate BOP. Dr. Colby recommends scaling and root planning along with soft tissue curettage. No other areas of the mouth need this treatment. How will you anesthetize the localized area?** *

Mark only one oval.

- ◯ Left PSA, Left MSA, Left GP
- ◯ Right PSA, Right MSA, Right GP
- ◯ SP #5, ID to Mesial and Distal papilla to Li #5
- ◯ SP #12, ID to Mesial and Distal papilla to Li #12

10. **For your patient today, Dr. Yamada will be doing flap surgery in Sextant 1. He asks you to anesthetize all teeth, soft tissue, and bone in this area. What blocks will you administer?** *

Mark only one oval.

- ◯ Left PSA, Left MSA, Left GP
- ◯ Left PSA, Left MSA, Left ASA, Left GP, NP
- ◯ Right PSA, Right MSA, Right GP
- ◯ Right PSA, Right MSA, Right ASA, Right GP, NP

11. **Dr. Arucan recommends soft tissue curettage for the patient seated in your chair, teeth #26-29. She will observe you administering local anesthesia prior to the curettage. The patient is afraid of needles and wants the least amount of injections. How will you anesthetize your patient?** *

Mark only one oval.

- ◯ Left IA/Li
- ◯ Right IA/Li
- ◯ Left Mental/Incisive with ID to Mesial and Distal papillas to Li #26-29
- ◯ Right Mental/Incisive with ID to Mesial and Distal papillas to Li #26-29

12. **Your dentist is running behind schedule and asks you to anesthetize her next patient. She requests pulpal anesthesia on tooth #21. One important piece of information to consider is that the patient has an interview after today's appointment. How will you anesthetize tooth #21?** *

Mark only one oval.

- ◯ ID to Mesial and Distal papilla to Li #21
- ◯ Left IA/Li
- ◯ Left mental and left incisive
- ◯ SP #21

13. **Identify what is being innervated with the corresponding injection.** *

Mark only one oval.

- ASA
- ID papilla between #8/9
- Maxillary frenum
- Premaxilla area

14. **Identify what is being innervated with the corresponding injection.** *

Mark only one oval.

- ASA
- ID papilla between #8/9
- Maxillary frenum
- Premaxilla area

15. **Identify what is being innervated with the corresponding injection.** *

Mark only one oval.

- ◯ ASA
- ◯ ID papilla between #8/9
- ◯ Maxillary frenum
- ◯ Premaxilla area

16. **Upon evaluation, you discover that QIII has 4-6mm pocket reading with detectable heavy subgingival calculus. The tissue is fibroedematous with heavy BOP. Dr. Oishi recommends scaling and root planning along with soft tissue curettage. Anesthetize the localized area.** *

Mark only one oval.

- ◯ Left IA/Li, Left LB
- ◯ Left PSA, Left MSA, Left GP
- ◯ Right IA/Li, Right LB
- ◯ Right PSA, Right MSA, Right GP

17. **Due to the edematous tissue presented in sextant 2, you're prompted to do soft tissue curettage in this area. To provide patient comfort, you will need soft tissue, bone, and pulpal anesthesia. The patient wants the least amount of injections.** *

Mark only one oval.

- ◯ Bilateral ASA and NP
- ◯ Left ASA, NP
- ◯ Right ASA, NP
- ◯ SP to teeth #6-11

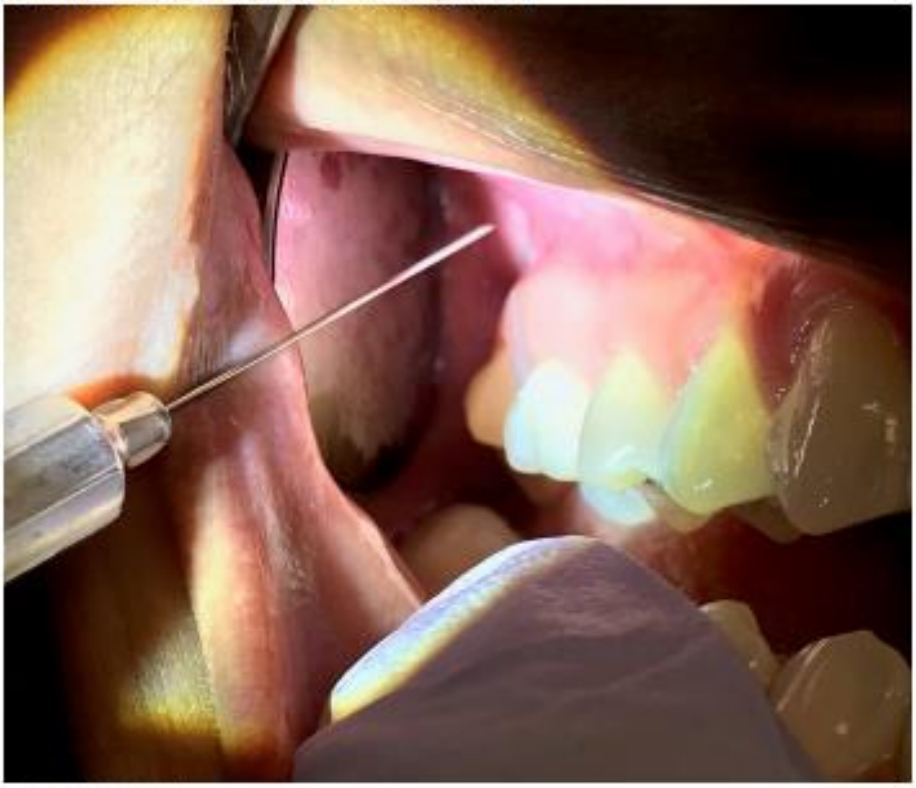
Anesthesia Injection Technique

18. **Where is the correct injection site for Supraperiosteal #9?** *

Mark only one oval.

- A
- B
- C
- D

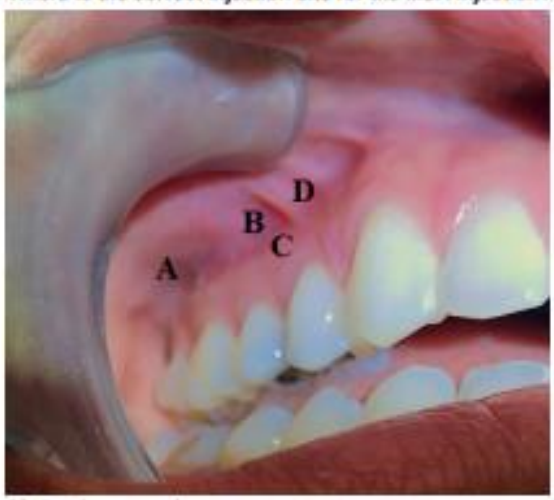
19. **What block is being displayed in the following picture?** *



Mark only one oval.

- ◯ GP
- ◯ MSA
- ◯ PSA
- ◯ SP

20. **Where is the correct injection site for the MSA injection?** *



Mark only one oval.

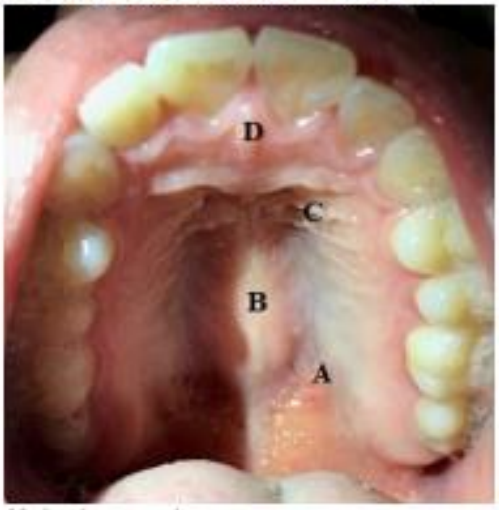
- A
- B
- C
- D

21. **Where is the correct injection site for the ASA injection?** *

Mark only one oval.

- A
- B
- C
- D

22. **Letter A is the injection site for which block?** *



Mark only one oval.

- ID
- GP
- NP
- SP

23. **The circle indicates the injection site for which block?** *

Mark only one oval.

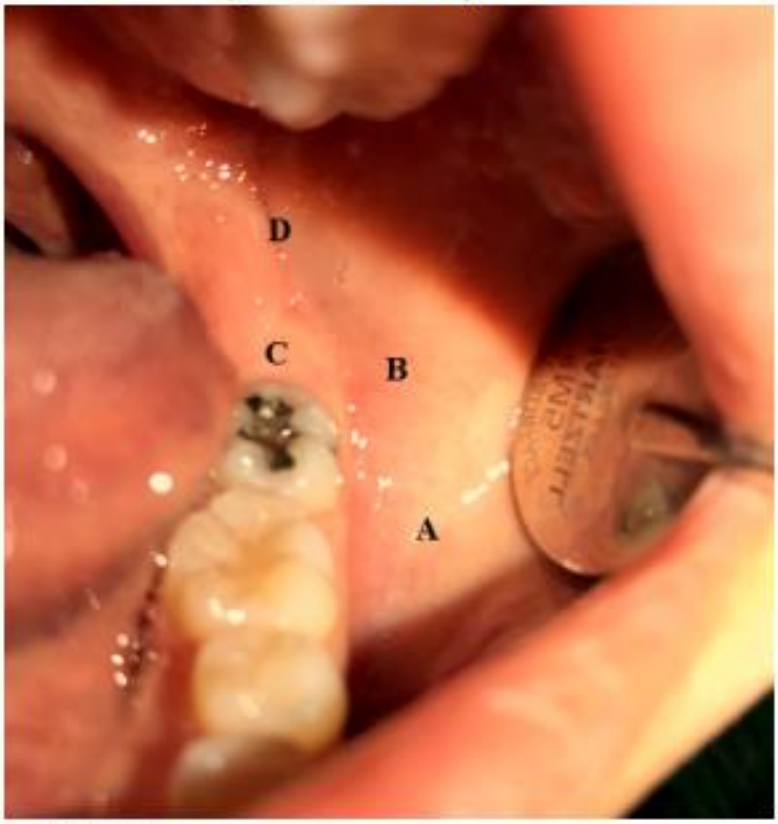
- ID
- GP
- NP
- SP

24. **Where is the correct injection site for the IA/Li injection?** *

Mark only one oval.

- A
- B
- C
- D

25. **Where is the correct injection site for the LB injection?** *



Mark only one oval.

- A
- B
- C
- D

26. **Where is the correct injection site for the mental/incisive injection?** *

Mark only one oval.

- A
- B
- C
- D

27. **Where is the correct injection site for an interdental injection?** *

Mark only one oval.

- A
- B
- C
- D

APPENDIX G
Attitudinal Survey

Exit Survey

Please fill out the following survey regarding the "Dental Anesthesia Technique & Review: An Instructional Design Project" module that you reviewed today.

* Required

1. **Enter ID** *

_____

2. *

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Not applicable	Don't know
The instruction was presented in an interesting manner.	◯	◯	◯	◯	◯	◯	◯
I understood the topics and concepts that were taught in this module.	◯	◯	◯	◯	◯	◯	◯
The information presented helped me achieve the stated objectives.	◯	◯	◯	◯	◯	◯	◯
There was a sufficient number of practice exercises included in the module to effectively answer the test questions.	◯	◯	◯	◯	◯	◯	◯
The practice exercises were relevant to the material being presented.	◯	◯	◯	◯	◯	◯	◯
The feedback received on my practice exercises were sufficient and easy to understand.	◯	◯	◯	◯	◯	◯	◯
The tests adequately measured my knowledge of the concepts learned.	◯	◯	◯	◯	◯	◯	◯
I felt confident in my ability to answer the questions in the tests.	◯	◯	◯	◯	◯	◯	◯

3. **Any additional comments or suggestions regarding the content or material presented in the website?**

_____

4. **Any additional comments or suggestions regarding the presentation or functionality of the website?**

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